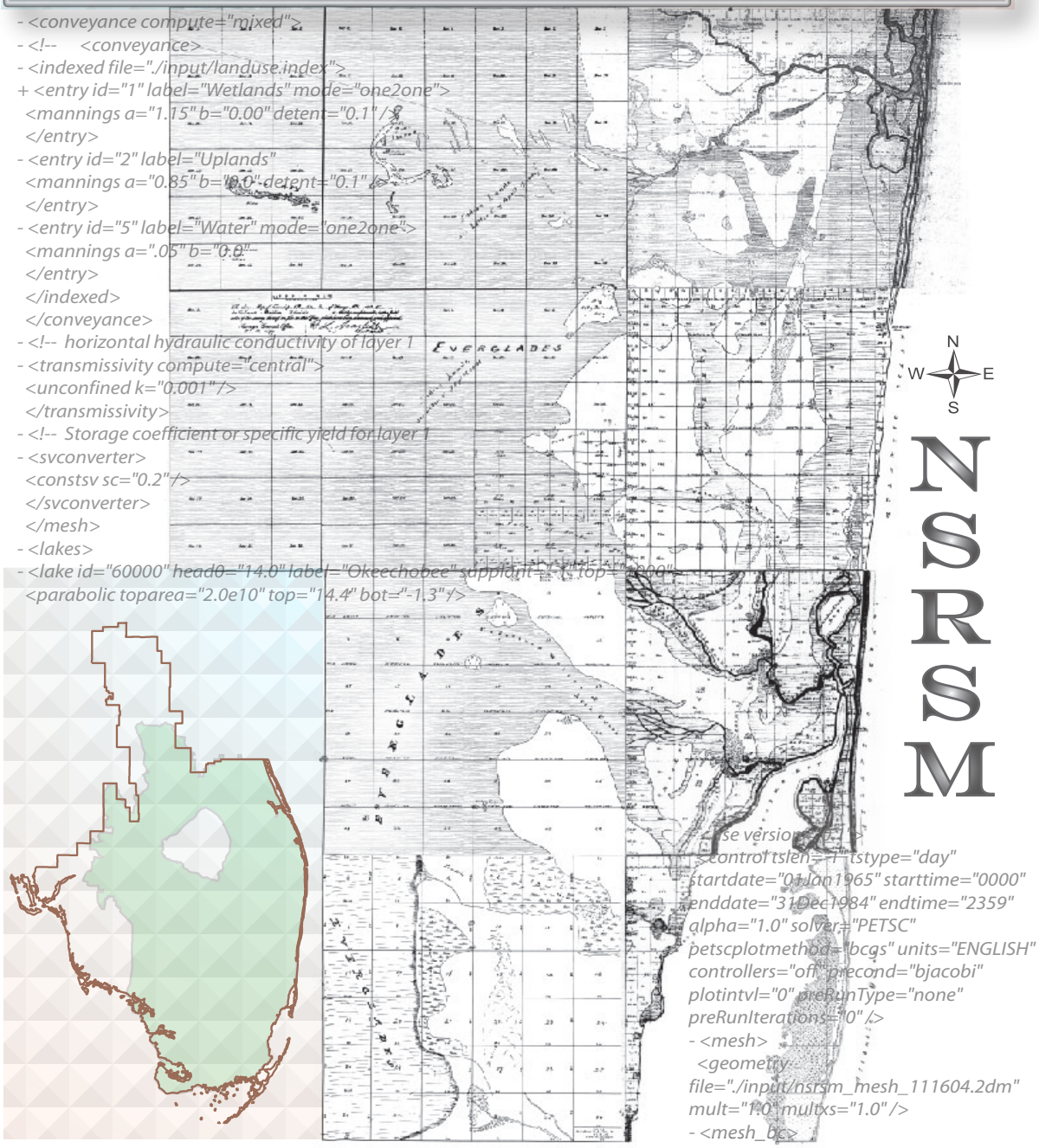
Natural System Regional Simulation Model



Overview

The Natural System Model (NSM 2x2) was developed as "…a tool which mimics natural and, eventually, pre-drainage hydrology, with the limitations of recorded history… to provide insight in evaluating alternatives for future restoration initiatives" (Davis and Ogden, 1994). In keeping with this concept, NSM application has played a significant role in the C&SF Project Restudy, CERP, and Water Supply planning processes.

In an effort to improve natural system hydrology simulation, we are in the process of implementing the next generation NSM based on Regional Simulation Model (RSM) governing equations, numerical methods, and object oriented software design. RSM is a finite-volume based model capable of simulating multi-dimensional and fully integrated groundwater and surface water flow. The Natural System Regional Simulation Model (NSRSM) will be developed and implemented concurrently with the South Florida Regional Simulation Model (SFRSM), its managed system counterpart.

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Simulation Engine

The NSRSM will be powered by the Hydrologic Simulation Engine (HSE) while the SFRSM will require additional components designed to simulate operational controls (Management Simulation Engine). The HSE simulates the physical processes in the hydrologic system, including water storage, flow, rainfall and evapotranspiration. Overland flow, groundwater flow, and lake storage and flow is simulated in an integrated system using water movers that control fluxes between water bodies- a concept particularly suited to natural system application.

Model Domain

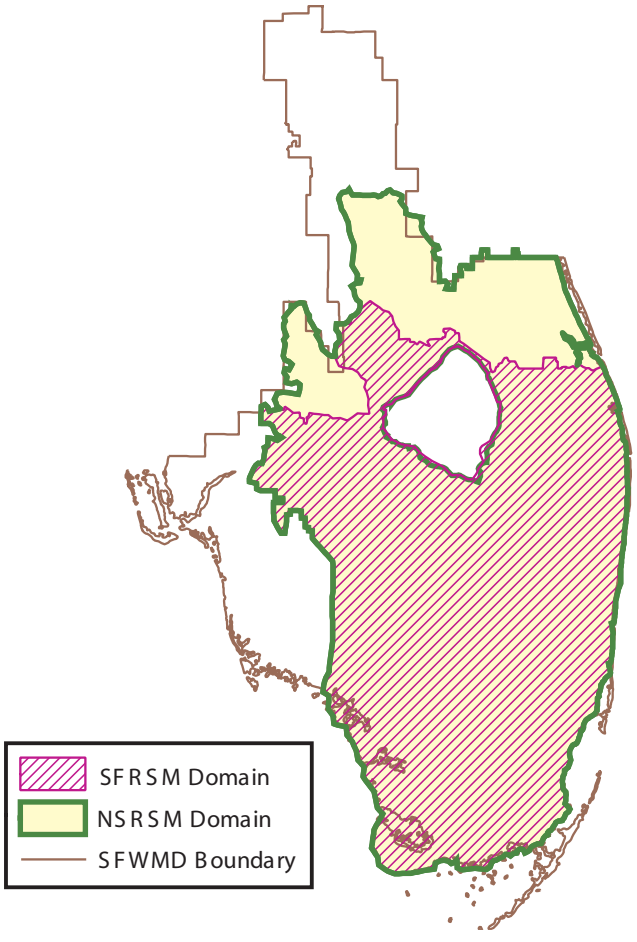
The NSRSM model domain is identical to the SFRSM domain with the addition of lower Kissimmee, Fisheating Creek, and St. Lucie River watersheds (See figures below). Boundary conditions will provide input from the upper Kissimmee basin.

Timeline

A validated version of the NSRSM is expected to be available for peer review in September 2005. The first model release for application will follow at a schedule partially dependent upon peer review comment.

A Comparison of Model Domains

NSRSM domain compared to the
South Florida Regional Simulation Model (SFRSM)



NSRSM domain compared to the
South Florida Water Management Model (SFWMM 2x2) and
the Natural System Model (NSM 2x2)